Winter 2-10-2020

Classification and its purpose in Internet Age: Current Trends and Future Direction

Madaiah Krishnamurthy
mkrishna_murthy@hotmail.com

Classification and its purpose in Internet Age: Current Trends and Future Direction

M. Krishnamurthy, B. Subhash Reddy and A.Y. Asundi

DRTC, Indian Statistical Institute, Bengaluru - 560 059, India
mkrishna_murthy@hotmail.com
AMET University, Kanathur, Chennai - 603 112, India
Subhashreddy2005@gmail.com
[3]Department of Library and Information Science, Bangalore University, Bangalore - 560056, India
ashokasundi@rediffmail.com

Abstract: A study of knowledge seeking behaviour of users is essential for evolving suitable guidelines for knowledge organisation and processing. The features of knowledge organisation and its use in problem-solving and decision-making are explained. Classification plays an important role in knowledge organisation. An understanding of mental models and mental maps helps in information needs of users effectively. The schemes classification in knowledge processing is highlighted. The paper examines the scope of knowledge organisation in the modern technology and its application.

Keywords: Classification, knowledge organisation, Information processing, ontology classification

1. Introduction

The Classification is a fascinating field of research in the Library and Information Science. For more than a hundred years research in the library, classification has attempted to find ways and means to organise knowledge contained in documents in a concise and indicative way. It has provided tools and techniques to lighten up the path for scanning, browsing, selecting and retrieving the documents by seekers of knowledge in libraries. Ranganathan defined the function "classification as one of the unavoidable incidents in broadening education into a great highway whereupon all can travel to the end of life. It is a not merely the progressive un foldment of the personality of each individual to be the fullest extent and at his own speed but also a composite social process whereby organised community itself develops its own personality and efficiently. The invention of classificatory language is, therefore, no a mere professional indulgence but a necessity brought on the library profession by it new primary mission". (Ranganathan, 1944) A brief history of the research of the second half of the twenty-first century will serve to illuminate the process of categorizing and its relationship to classification.

2. Knowledge Organisation

Knowledge organisation is a mental act. It is the totality of ideas evolved out of human minds at different times and in different climes. It is the preserver of human civilization and culture. Knowledge results from the interaction of human beings with and to know the nature and other surroundings. The base of knowledge is extended by the human observation and synthesis power. Knowledge itself does not have any shape. It is the human intellect that organises it into different modules convenient for absorption by the human mind. In order to learn, teach and utilise, knowledge is given specialised structures, so that concentration is bestowed on problems in an intensive manner. All these activities are different aspects of a communication process classification that is the representation of knowledge is a lamina in this communication. Classification assists any

communication process. It provides a outline of reference to any person for study of information and communication environment. It helps identification to print from non-print, scholarly needs from popular needs, message storage from message transfer. In general, it helps to identify the patterns and structure at different levels of knowledge transfer. The classification runs as a thread in the fabric of communication knowledge. Therefore, it is necessary to organise information to specific environments, to various media, and various levels of technological development. The new role of classification in information transfer is to act as the filter for information flood.

3. Classification Theory and its Purpose

In an excellent review of the role of Ranganathan's Classification theory in knowledge base system which includes library systems, information system, and expert systems besides many others, A Neelameghan (Neelameghan, 1992) identified the following features and base for knowledge organisation.

- Organising concepts in and structuring knowledge bases, specialised databases, etc:
- Designing schemes for classification:
- Designing and developing vocabulary control tools, such thesaurus, chasseurs etc:
- Generating various types of structured indexes:
- Preparing the field definition table/data dictionary for databases:
- Recognising inter-relationships among concepts and linking them accordingly;
- Assisting user to browse/navigate more conveniently in the database to zero-in on the specific areas of interest to him/her at the moment;
- Facet analysing user's query and structuring search expressions for better results in online retrieval;
- Presenting the retrieval records/ information in a sequence helpful to users;
- Object-oriented analysis and design; and
- Possible in neural networks and cognitive modeling.

4. Classification Schemes

Traugott Koch (Koch et al., 1997) has pointed out there are broadly four varieties of Classification schemes:

a) Universal Schemes-examples include the Dewey Decimal Classification (DDC), the Universal Decimal Classification and the Library of Congress Classification (LCC).
b) National and general schemes-universal in subject coverage but usually designed for use in a single country. Examples include the Netherladse Basisclassificate (BC) and the Sveringes Allmama Biiblioteksofening (SAB)
c) Subject Specific schemes-designed for use by a particular subject community. Examples include Iconclass for art resources, the National Library of Medicine (NLM) scheme for medicine, and Engineering Information (Ei) for engineering subjects.
d) Home-grown schemes –schemes-schemes devised for use in particular service. An example from the Internet is the 'Ontology' developed for the internet search service.
e) NIPPON Decimal Classification NDC (Japan)
f) Korean Decimal Classification KDC (South Korea)

5. Categorisation at Generic Levels

Further, we see that in knowledge seeking there is a flow from unfamiliarity to familiarity, uncertainty to certainty, ignorance to understanding or from haziness to clarity. In other words, the knowledge seeking phenomenon exhibits a kind of abstract to a concrete situation, a kind of no information to a kind of all information. This presents a kind of taxonomy of stages of knowledge consumption. Knowledge organisation has to incorporate this knowledge for the convenience of assimilation. Thus every communicator of knowledge aims to reflect this approach. The situation in Information science and those in knowledge bases in the computer communication world adopt a variety of representation systems which exhibit all the features of the components of the knowledge theory represent. The constraints particularly hardware ones, which were inhibiting knowledge representation in the computer communication records are being overcome by continuous and productive research in the field of information technology. It is this versatility of hardware systems that have given scope for looking at the nuances that are needed to transfer information to cognitive minds for assimilation.

6. Information Processing

The purpose of knowledge processing is to ensure that a user is able to get the needed information expeditiously and pin-pointedly. The systems, tools, and techniques developed for knowledge processing should be user-friendly. They vary on the basis of fluctuations in the nature of demands, changes in the formats and medium of recorded knowledge. In the context of changing technological developments, many tools and techniques are evolved in the computer-mediated information communication systems. With the change from conventional to computer-mediated information systems, the information seeking behaviour of uses and the methodologies used have also been changing. The current era has been called the age of information. We get information through radio, television, book,news papers, magazines, reports, patents, standards, and internet. While information flood is extensive and complex, the individual's memory has not grown in size. The environment is continuously projecting a variety of information and their innumerable interpretations. To cope with this flood there is a need for an adaptive information processing system such as classification that would reduce information into a set of parameters whose change in value will project the contextual relevance. Ranganathan's concept of PMEST and his postulate of basic subjects provides one such model of a parametric structure.

7. Analytico Synthetic Classification

Analytico Synthetic Classification was the forte of S.R.Ranganathan. He believed in the construction of class number appropriate to the subject of the documents to be classified. He had the panache for precision in expression. Brevity and expressiveness were his goals. Ranganathan's Colon Classification began to shape during 1924-1932. The schemes structure began to evolve from the collection of the Madras University library. Thus, a wide spectrum of collection and users needs had to be organised and matched or the productive services. The theory began to concretize in the form of rules of classifying and later on the rules for revising. Further, as the scheme had to be taught to several persons, the body of scientific theory of classification began. Over the decades to emerge when Ranganathan devoted himself to teaching and research, his movement was towards perfecting the body of knowledge into the science of classification(Ranganathan, 1937). The principal contribution of Ranganathan in the field of library classification may be summarised as follows:

- The design, development, and application of an analytic-synthetic classification.
- The provision of autonomy for classifiers to make the decision about the subject structure as well as class number structure appropriate to the needs of the environment of the library.
- The development of guidelines for consistent classification of the subject of documents.
- Developing an explicit methodology for designing of the classification system by dividing the work into three planes.

8. Developing Schemes for Classification

Keeping classification schemes up to the date have several problems. The first and foremost is to refashion their original structure to meet the current needs. Knowledge organisation these days demand quick restructuring. Knowledge domains such as cybernetics, computer science, representation theory, pattern recognition, cognitive studies, and managementstudies reveal the shifting paradigms that call relocations and re-orientation. While the old is retained, the new approaches have to be represented to give comprehensive knowledge representation. Towards this end, we find a recent phenomenon where the Bliss Classification and the Universal Decimal Classification aim to collaborate(Svenonius, 1992). This investigation is an attempt towards the application of the knowledge base of one scheme over restructuring the Universal Decimal Classification class by class. The study uses the facet framework established in Bliss Bibliographic Classification, as the basis for the restructuring UDC. The research is being carried out using the discipline of Medical Sciences. It also derives a thesaurus from the restructured schemes(McIlwaine & Williamson, 1994). The methodologies designed for schemes for classification in India have been attempting to find this universally of import and export between classification schemes, thesauri, and index. The three planes of work demarcated by Ranganathan namely, idea plane, verbal plane, notational plane do have the basic contribution towards the adequacy of knowledge representation.

9. Ontology Classification

Depending on the different parameters, there are several classifications of computer sciences ontologies.

Uschold and Gruinger (Uschold & Gruninger, 1996)have discussed in detail the principles, methods, and characteristics of ontologies. They have classified ontologies depending upon their formality by which a vocabulary is created and complexity as a continuum as belonging to the following major categories:

- Highly informal: stated loosely in natural language semi-informal expressed in a restricted and structured form of natural language greatly increasing clarity by reducing ambiguity
- Semi-formal expressed an artificial formally defined language e.g. Ontolingua version of the enterprise ontology
- Rigidly formal: meticulously defined terms with formal semantics, theorems, and proofs of such properties as soundness and completeness. E.g, TOVE

Guarino (Guarino, 1998)classifies them based on their level of generality in:

- Top-level ontologies, describe domain-independent concepts such as space, object, event etc., which are independent of specific problems.
- Domain and task ontologies describe, respectively, the vocabulary related to a generic domain or a generic task or activity.

- Application ontologies, which describe concepts based on a particular domain and function, are both specialized for related ontologies.

10. Future Directions

Classification research tends towards the development of formal theories to guide a variety of applications. It should help the development of schemes appropriate to the needs of knowledge organisation. Further, research in the field should work towards the following aspects:

- Classification should tend towards expressiveness of concepts, subjects, and a universe of subjects; there should be the movement towards a unique representation of concepts and their contexts.
- Classification system should be made compatible with efficient communication or various interferences needed in a situation. That is, it should be able to provide generic structure and in-depth structures.
- Classification system should have intellectual and surrogation preciseness. Schemes should tend towards compactness and clarity; the appropriate level of abstraction.
- Different types of knowledge should be capable of being, expressed with the same general representation scheme. Universal systems should provide for atomised special systems of surrogations.
- Classificatory language should reflect logical consistency. The neutral exclusiveness should be contextually separated and represented.
- Classificatory language should be able to provide schemes for multiple representations of knowledge.
- Development classification schemes for surrogation that are progressively comparable with researcher's needs-user friendliness.

The areas of research would be towards integrated development of the conceptual structure of subjects, classification structure, and surrogational economy. This would help the searchers in moving towards faster retrieval. Comprehensive browsing and focusing and interfacing. The role of classification is envisaged by Ranganathan is the following quotation: "Classification can illuminate the field of knowledge; it can be prophetic. To make it fit for this new role. It must be placed on a new type of information and built in a new way.

11. Conclusion

Classification provides an excellent framework for all information activities from the point of generation to the point of utilisation of information. Knowledge classification enhances the productivity of a creative person. Classification is a process in which we deal in to recognise the existence of the context of the whole, in varieties, and components identity. Identify the goal seeking principles for combining components of information adds to the creative process of combination."It is needed so, to organise contributions to knowledge of all kinds expressed in diverse languages as to establish contact between them and the readers in the measure of their activity and specificity. Classificatory language is the only lingua franca answering the purpose"(Ranganathan, 1944).

References

Guarino, N. (1998). *Formal ontology in information systems: Proceedings of the first international conference (FOIS'98), June 6-8, Trento, Italy* (Vol. 46). IOS press.

Koch, T., Day, M., Brummer, A., Hiom, D., Peereboom, M., Poulter, A., & Worsfold, E. (1997). The Role of Classification Schemes in Internet Resource Description and Discovery - Introduction. *The UK Office for Library and Information Networking*, (February 1997), 1. http://doi.org/10.13140/RG.2.1.2710.0007

McIlwaine, I. C., & Williamson, N. J. (1994). A feasibility study on the restructuring of the Universal Decimal Classification into a full-faceted classification system. In *Proceedings of the 3rd International Society for Knowledge Organization (ISKO) Conference: Knowledge Organization and Quality Management, Copenhagen, Denmark* (pp. 20–24).

Neelameghan, A. (1992). Application of Ranganathan's general theory of knowledge classification in designing specialized databases. *Libri*, *42*(3), 202–226.

Ranganathan, S. R. (1937). *Prolegomena to library classification*. Madras Library Association, Madras.

Ranganathan, S. R. (1944). *Library Classification: Fundamentals & Procedure: With 1008 Graded Examples & Exercises*. Madras library association.

Svenonius, E. (1992). The impact of computer technology on knowledge representation. In *Cognitive Paradigms in Knowledge Organisation. Second International ISKO Conference, Madras 26-28 August 1992* (pp. 1–14).

Uschold, M., & Gruninger, M. (1996). Ontologies: Principles, methods and applications. *The Knowledge Engineering Review*, *11*(2), 93–136.